

July 31, 2007

DTSC
Green Chemistry Initiative
Department of Toxic Substances Control
P.O. Box 806
Sacramento, CA 95812-0806

Received
August 1, 2007

Subject: Feedback - California Green Chemistry Initiative

Dear Sir Madam,

The following is feedback to the questions provided by the Department of Toxics Substances Control.

After over 16 years of environmental engineering experience working for the Department of Defense (DOD), two tools have been identified that require coordination and work to fully implement. These tools are standardization of the LCA process as feasible covering most products and the Chemical Compliance Systems (CCS) quantitative analysis database programmed with data to rank any chemical relatively to the universe of chemicals (quantitative analysis) and compare to the regulatory limits using the standardized environmental performance characteristic data provided by EPA and CAL EPA.

With some work, these approaches would significantly improve the environment. At DOD and with those I interface with in the DOD and industry, it is not a question of the intention to improve the environment and work "beyond compliance," but is a question of providing key data to the chain of industries moving product to market. This is now possible utilizing the CCS tool or similar applied to the LCA stages.

Beyond the work, is a key to require manufacturers of chemicals, substances and products to provide both the hazardous chemicals in the Materials Safety Data Sheet (MSDS) and the non-hazardous chemicals so that a valid green rank score and comprehensive report may be provided via the web on-line automatically and real time. The report contains all the CALEPA and FED EPA environmental characteristics of concern with a normalized Environmental SCORE organized by the key areas ECOLOGY, HUMAN HEALTH and HUMAN SAFETY.

Utilization of the ISO 14001 Environmental Management System (EMS) continual improvement for the environment of sustainability is an active process in DOD and city municipalities in whole or part that provides the management approach. Key is feedback to the manufacturers of chemicals, academia, industry, consumers etc so that the best choice for the environment may be made by all.

This will mitigate the predicted increase of toxic pollution in the environment by CAL BERKLEY (see www.ucop.edu/cpre) "Special Report" Green Chemistry in California despite all the effort.

Beyond Compliance is normal standard practice by DOD and industry. The key is quality real time information feedback to make the best choices by all involved in the “Cradle to Cradle” process of manufacturing-construction-R&D. As a team much is possible. Playing this in parts and pieces is not efficient.

Sincerely,
Ray Paulson, P.E.

Fleet Readiness Center Southwest North Island

Cradle to Cradle: Through product design and industrial innovation, produce products that reduce the use of harmful chemicals, thus generating fewer emissions and less waste. How do you think California can move to a Cradle to Cradle approach?

There are five basic stages to Life Cycle Assessment (LCA) including (a) “Materials Acquisition,” (b) “Manufacturing-Construction-Research and Development,” (c) “In Use,” (d) “Reuse and Treatment” and (e) “Recycling and Treatment.”

In these stages, each has basic inputs and outputs standard to any Life Cycle Assessment (e.g. raw materials, reused and or recycled materials, energy and water input and the multimedia waste output including CO₂ and CO₂ equivalent air emissions; Some waste may be reused as an input).

If a web site is hosted by California with databases of standard conservative values for the inputs and outputs for the five LCA stages standard to any “Cradle to Cradle” analysis, with input available as feedback, companies and consumers may generate an LCA and associated Life Cycle Cost Assessment (LCCA) using these and other values that require referencing (validation) to make the best selections for the environment. While there has been aim at “cradle to cradle” LCA since the early 1990’s, not much is done because there is little to no information available to conduct the LCA. Information is the key for making progress of LCA.

For example, for the materials acquisition LCA stage, the input and output values for the typical LCA may be put into a database AND MADE AVAILABLE for typical base materials used for many applications to product formation. As there are only so many companies providing base materials to manufacture products, a database may be set up and kept current by a key body of individuals paid for this work. The other LCA stages may be handled similarly as practical. With this information readily available, a cradle to cradle LCA analysis may be conducted easily. At a minimum, the areas that utilize the priority harmful chemicals may be sited and the information made available.

In addition, Chemical Compliance Systems (CCS; Dr. George Thompson at (973)-663-2148; georgethompson@chemply.com; www.chemply.com) has developed a comprehensive database of all chemicals that have ever been utilized internationally (220,000 in total and growing as required to maintain comprehensive status) with every cross reference chemical

name and CAS number linked to the Environmental Performance Characteristics given by USA EPA and CAL EPA (with other key data from certain states that have validated characteristics and certain nations). These characteristics are the key data utilized by regulators to define a material non-hazardous, hazardous and extremely hazardous or the equivalent for all materials input and waste output. With the chemical information for any product or waste, weights may be assigned for the characteristics (equal or as is appropriate) applied to the chemical makeup for the resultant report (the characteristic values for the chemicals and concentration or weight fraction etc) and GREEN SCORE with SCORES for ECOLOGY, HUMAN HEALTH AND HUMAN SAFETY.

For example, given that the chemical makeup is known for any product (material, substance etc) or waste, the GREEN SCORE and REPORT may be provided automatically via database after the chemical makeup is electronically entered. The report and GREEN SCORE takes seconds to produce.

This work has been successfully completed for munitions in DOD, face cream, wall paint, Navy aerospace coatings etc.

I work for the Fleet Readiness Center Southwest Environmental Program Office seeking to score all products used the command. The MIL-SPEC approved materials will have a GREEN SCORE associated with the product so that the entire command will have information in advance to make the best GREEN PURCHASE decision. To date, this is the only process identified able to meet the Green Procurement requirements set forth in the Executive Orders requiring all Federal Facilities to procure GREEN. This tool may be applied to the end product only (IN USE LCA STAGE) and the other LCA stages as information is made available. In this way, a comprehensive cradle to cradle analysis is performed ranking ALL MATERIALS and ALL WASTE with the same data the regulators utilize to make the best decision for the environment. This tool is a P2 managers dream.

What would work better is partnering with the regulators on a project to host a web site made available to all companies, non-profits, government, academia, etc that provides the same service as the CCS tool. The CCS tool took over 25 years to put together and would requires fees to rank products (in the hundreds of dollars per product) so that the company can pay back the investment. If the State of California would pay the company a lump sum (I spoke to George and he states that \$10 million would cover the company and employees) so that there would be no cost to quantitatively rank products and waste for chemical makeup (the missing link in all P2 studies because of the expense). With this ONE TIME fee and an annual cost of \$150k or so to key the database comprehensive and up to date, the WILKEPEDIA style web site hosted by CAL EPA or EPA would be made available to all people. With this tool, all products would have the NECESSARY FEEDBACK to CONTINUALLY IMPROVE for the ENVIRONMENT. Companies, Academia, Government, Consumers etc could then make BETTER CHOICES. This would be the biggest P2 Project ever to improve the environment through P2 source reduction and the COST BENEFIT more than justify the expenditure based on the money spent by government today within the DOD and regulatory agencies. Without an approach like this,

the projections for the environment are not good based on the recent report put out by Cal Berkley. This report estimates, based on EPA data that waste will continually increase as will contamination in the environment (see “Special Report” Green Chemistry in California by California Policy Research Center University of California www.ucop.edu/cpre ; cprc@ucop.edu ; (510) 642-5514. With this type approach, companies may work “BEYOND COMPLIANCE” with valid information to directly benefit the environment through P2 Source Reduction.

Green Chemistry: Consider public health and the environmental effects of chemicals during the process of designing products and industrial processes. How do you think California can stimulate a Green Chemistry transformation in the design of products and processes?

Provide the following on all labeling for all products for sale in California:

Green Score (using the above automated Chemical Compliance Systems Database)

Green House Gas Rating (CO₂ and CO₂ Equivalent)

Actual Cost

Consumers may then make a informed decision. The Green Score may utilize only Federal USA EPA and State of CAL EPA Environmental Characteristics already in use by these agencies (i.e. LD50, Flammability, Etc)...Call CCS Dr. George Thompson at (973)663-2148 (an up to date comprehensive database for real time data and scoring). The DOD has utilized this tool for many evaluations. Purchasing this database would be cost effective for systemic Green Ranking utilized by all for the biggest Pollution Prevention Project ever and the most cost effective. An in-house or contracted small group could keep the database current made available for all to utilized to reformulate products and to make better choices for purchasing products.

Toxics in Products by Design: Identify strategies to encourage manufacturers to take greater responsibility for the products they produce that contain toxic materials. What strategies do you think California should pursue?

See the above. What has worked is Voluntary reductions with real feedback primarily with compliance addressing the chemicals of most concern (toxicity and volume etc).

Continual Improvement using the CCS tool and the ISO 14001 Environmental Management Approach (EMS) approach to continually improve beyond compliance moves results fast. The feedback automated computer tool essential for fast results for the